

Baroreflex Sensitivity Evolution before Weaning From Mechanical Ventilation

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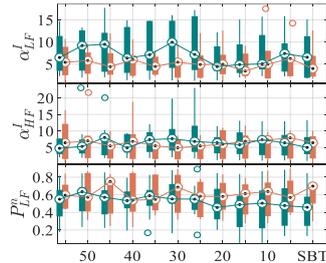
Weaning is the process of withdrawing mechanical ventilation at the Intensive Care Units (ICU). Weaning predictors help clinicians predict whether weaning attempts will be successful or not. However, around 20% of weaned patients need to be reintubated. In this context, studies suggest that vagal dysfunction is lower in patients successfully weaned. This study aims to evaluate the Baroreflex Sensitivity (BRS) in the last hour prior to the Spontaneous Breathing Trial (SBT) and explore if this can provide additional information to improve the prediction of weaning outcomes.

9 successfully weaned (*S*) and 6 unsuccessfully weaned (*F*) patients were monitored at the ICU of the *Hospital Universitari Parc Taulí* of Sabadell (Barcelona). Temporal parameters of HRV are computed along the one-hour recording.

Time-Frequency analysis is used to obtain the frequency indices of HRV and the BRS index, α (ms/mmHg), in the LF and HF band. The analysis is guided by respiration, so the HF band is redefined to be centred at the respiratory frequency, f_R . The BRS is also estimated through the Bivariate Phase Rectified Signal Average (BPRSA). The indices obtained from the BPRSA curve

Median and IQR for Mean values, Temporal HRV parameters and BRS_{BPRSA} indices.

	<i>S</i>	<i>F</i>
Mean HR (bpm)	80 (75,89)	84 (81,123)
Mean SAP (mmHg)	132 (110,139)	126 (101,141)
Mean f_R (rpm)	19 (18,23)	22 (18,24)
<i>SDANN</i> (ms)	29 (21,39)	14 (9,6,19)
<i>SDNN</i> (ms)	32 (27,53)	22 (15,26)
<i>SDNN i</i> (ms)	19 (16,32)	14 (8,8,23)
<i>RMSSD</i> (ms)	11 (6,14)	5.3 (2.7,8.4)
<i>C-BPRSA</i> (%)	0.8 (0.35,1.7)	0.5 (0.39,0.78)
<i>PSD_{BPRSA curve}</i> (s^2/Hz)	0.0044 (0.0011,0.013)	0.00093 (0.00052,0.0025)



Evolution of 5-min averaged α_{LF}^I , α_{HF}^I and P_{LF}^n in the hour prior to SBT for the *S* (green) and *F* (red) groups. Circles represent outliers.

are the Acceleration Capacity (C) and the total Power Spectral Density (PSD).

The current indices of weaning readiness (mean HR, SAP and f_R) do not show statistical differences (see Table). HRV indices exhibit that *F* patients have higher sympathetic activity. BRS $_{\alpha}$ and BRS_{BPRSA} is higher for *S* group suggesting a recover of the autonomic function and so the cardiovascular regulation. These results suggest that BRS quantification is potentially useful for predicting weaning outcomes and it should be further explored.